

# **EXHIBIT A**

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.  
Petitioner

v.

COREPHOTONICS, LTD.,  
Patent Owner

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Case IPR2018-00549  
Patent 9,185,291 B2

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**PATENT OWNER'S PRELIMINARY RESPONSE  
TO PETITION FOR *INTER PARTES* REVIEW**

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**Patent Owner's Exhibit List for IPR2018-01348**

Pursuant to 37 C.F.R. § 42.63(e), Patent Owner Corephotonics Ltd., hereby submits its exhibit list associated with the above-captioned *inter partes* review of U.S. Patent No. 9,185,291.

<b>Exhibit No.</b>	<b>Description</b>
2001	Joint Claim Construction Statement filed in <i>Corephotonics, Ltd. v. Apple Inc.</i> , Case No. 5:17-cv-06457-LHK in the U.S. District Court for the Northern District of California.
2002	File History of U.S. App. No. 13/262,842 (“Golan”), Office Action, mailed Sep. 11, 2013.
2003	File History of Golan, Notice of Abandonment, mailed March 24, 2014.

## I. Introduction

The Petition fails to demonstrate a reasonable likelihood of prevailing in its challenge to any claim of U.S. Pat. No. 9,185,291. The Petition is replete with deficiencies and flawed reasoning, among them:

*First*, the Petition relies on modifying Parulski in view of Christie and Golan but fails to demonstrate that a POSITA would have been motivated to combine these references and modify Parulski. The Petition relies on this combination to contend that the prior art teaches that a dual camera system would be configured “to combine in still mode at least some of the Wide and Tele image data to provide a fused output image . . . and to provide without fusion continuous zoom video mode,” as required by the independent claims of the ’291 patent. However, the Petition fails to sufficiently demonstrate that this limitation is satisfied as (1) Christie does not teach the element of fusing image data from two cameras in still mode but not in video zoom mode; and (2) it relies on impermissible hindsight, conclusory statements, and speculation, all of which stem from a central flaw: that Christie does not teach anything about multiple cameras, telephoto cameras, or zoom.

*Second*, the Petition similarly fails to demonstrate how the “fused output image *from a particular point of view*” limitation is taught in the prior art. The Petition points to Parulski for this limitation, but what it identifies in Parulski does not disclose the ability to combine image data from both Wide and Tele cameras to

create a single composite image from “a particular point of view” as required by the ’291 patent. The Petitioner’s efforts to remedy this deficiency with a combination of conclusory statements in the Petition and references to substantive arguments in material outside the Petition flouts the rules governing these proceedings.

*Third*, the Petition fails to demonstrate how the “smooth transition” limitation is taught by Golan. The disclosure in Golan on which the Petition relies does not show that Golan’s purported system implemented “smooth transition” in switching between cameras or points of view during zoom video output, as required by the ’291 patent. The Petition again strains to extend Golan to reach the “smooth transition” limitation, and, in doing so, again both violates the prohibition against relying on materials outside the Petition and confirms that the Petitioner’s arguments are steeped in hindsight bias.

Should the Board decide to institute trial, then additional issues may be addressed. However, at this stage any of these defects is fatal to the Petition since each would defeat the Petitioner’s argument that any claim of the ’291 patent would have been obvious to one of ordinary skill in the art. Accordingly, the Petition should be denied under 35 U.S.C. § 314(a).



## **II. Background**

### **A. Apple's Petition**

Petitioner Apple Inc. has challenged claims 1-7, 10, and 12-13 of U.S. Pat. No. 9,185,291. The Petition asserts that claim 1 of the '291 is obvious under § 103 over U.S. Pat. No. 7,859,588 ("Parulski") in view of Pub. App. No. 2014/0362274 ("Christie")<sup>1</sup> and Pub. App. No. 2012/0026366 ("Golan").

The Petition does not provide distinct arguments regarding the other independent claim of the patent, claim 12. Pet., 75-76 (referring back to the discussion of claim 1 for each limitation of claim 12). Also, while the Petition raises a second ground, it does so only as to dependent claim limitations. *See* Pet., 81-87. Accordingly, this Preliminary Response need only address the Petition's arguments concerning claim 1 on the asserted ground of Parulski combined with Christie and Golan, because if the Petition does not show a reasonable likelihood of prevailing on claim 1, then it cannot prevail on any other challenged claim.

### **B. The '291 Patent (Ex. 1001)**

The '291 patent is generally directed to "thin digital cameras with optical zoom operating in both video and still mode." Ex. 1001, 3:15-16. It was issued on

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<sup>1</sup> The Petition asserts that Christie should be entitled to the priority date of its underlying provisional application. While the Petition fails even in view of the published Christie application, the Patent Owner reserves the right to address this issue if trial were instituted.

Nov. 10, 2015 and claims priority to a provisional patent application filed on June 13, 2013. As the patent describes, in the prior art, optical zooming required mechanically moving lens elements together, which were “typically more expensive, larger and less reliable than fixed focal length lenses.” *Id.* at 1:39-42. This is a particular problem for cameras that can go in mobile devices, like smartphones. Another prior art alternative was digital zoom, i.e., cropping the image and using computational methods to create the appearance of zoom, but at the cost of resolution. *Id.* at 43-48. The patent owner, Corephotonics, developed an innovative dual-aperture camera technology that uses two fixed-focal length lenses, a wide-angle lens as typically found in smartphones with single-aperture cameras, and a miniature telephoto lens with higher resolution in a narrower field of view. The petitioner, Apple, adopted this technology in its iPhone models with dual rear cameras, starting with the iPhone 7 Plus in September 2016 and continuing with its recent introduction of new iPhone models this year. The technology is also now used in smartphones made by other manufacturers, such as Samsung and Huawei.

To make this technology a reality, Corephotonics developed solutions to practical issues, some of which are the subject matter of the ’291 patent. For example, Corephotonics developed technology that uses image fusion to combine the images from the wide-angle (“Wide”) and telephoto (“Tele”) cameras for still pictures, but not use image fusion for video. In video, when zooming in, digital zoom

is used first on the image from the wide-angle camera only and then switched to the image from the telephoto camera only. When zooming back out, a similar transition happens from using the telephoto camera only, switching back to the wide-angle camera only. Because the two lenses are different and necessarily view the subject from different points of view, Corephotonics also developed special processing to achieve a smooth transition (i.e., one that minimizes the jump effect) when the view changes from the wide lens to the telephoto lens and back during video zoom.

Claim 1 of the '291 patent (Ex. 1001) recites (emphasis added):

**1. A zoom digital camera comprising:**

**a) a Wide imaging section that includes a fixed focal length Wide lens with a Wide field of view (FOV), a Wide sensor and a Wide image signal processor (ISP), the Wide imaging section operative to provide Wide image data of an object or scene;**

**b) a Tele imaging section that includes a fixed focal length Tele lens with a Tele FOV that is narrower than the Wide FOV, a Tele sensor and a Tele ISP, the Tele imaging section operative to provide Tele image data of the object or scene; and**

**c) a camera controller operatively coupled to the Wide and Tele imaging sections, the camera controller configured to combine in still mode at least some of the Wide and Tele image data to provide a fused output image of the object or scene from a particular point of view and to provide without fusion continuous zoom video mode**

**output images of the object or scene**, each output image having a respective output resolution;

**wherein the video output images are provided with a smooth transition when switching between a lower zoom factor (ZF) value and a higher ZF value or vice versa**, wherein at the lower ZF value the output resolution is determined by the Wide sensor, and wherein at the higher ZF value the output resolution is determined by the Tele sensor.

Fig. 2 of the '291 patent illustrates the issues that arise due to the different field of view of the Wide camera and the Tele camera, which provides for additional optical zoom capability with improved resolution but has a narrower field of view. As Fig. 2 shows, because the Tele camera has a narrower field of view than the Wide camera, the image generated by the Tele camera would only overlap within part of the wider field of view of the image generated by the Wide camera. The '291 patent discloses processing for the "still camera mode," which includes capturing synchronous images from both the Wide and Tele cameras, and fusing the Wide and

Tele images “to achieve optical zoom.” *Id.* at 7:25-39.

The '291 patent further discloses solutions to the problems posed by

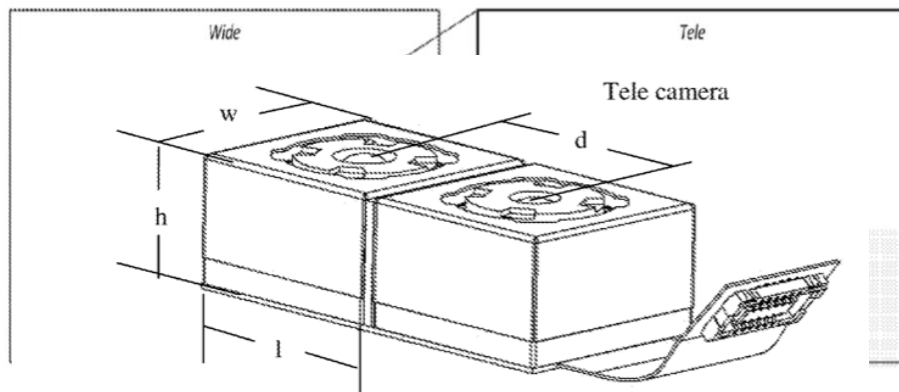


FIG. 1B

FIG. 2

generating images from separate Wide and Tele cameras on a device, as shown in Fig. 1B. Because the cameras are at different spatial positions, the images taken from each of the Wide and Tele cameras are seen from different points of view (POV). *Id.*, 4:60-5:2. The '291 patent discloses the acquisition of single zoom images from the Tele and Wide cameras in the still camera mode. *Id.*, 9:15-43. The patent further discloses how the camera controller can be configured in still mode to provide a fused output image from the point of view of the Tele camera at higher levels of zoom and Wide camera at lower levels of zoom, and transitioning between those while zooming in and out. *Id.*, 9:52-10:10. This is distinguished in the patent from a fused output image that includes a combination of both points of view. Ex. 1001 at 4:63-65 (“The system output image can have the shape and position of either sub-

camera image or the shape or position of a combination thereof.”). The claims require “a fused output image . . . from a particular point of view.” Ex. 1001, 13:13-14:10-11.

The ’291 patent recognizes that combining information from Tele and Wide cameras in video mode would require “very large processing resources in addition to high frame rate requirements and high power consumption (since both cameras are fully operational).” *Id.*, 2:24-28. Based on its recognition of this problem, the invention does not use image fusion for video zoom mode, but instead provides processing to achieve a “smooth transition” when switching the view from Wide to Tele when zooming the cameras in video mode. The ’291 patent teaches that in video mode, while increasing zoom, digital zooming may be performed on wide-angle images up to a zoom factor at which operation would switch over to the telephoto camera, and vice versa. *Id.*, 10:56-11:5. The ’291 patent discloses that in a dual-aperture camera system, while displaying video, if the zoom operation switches “between sub-cameras or points of view, a user will normally see a ‘jump’ (discontinuous change).” *Id.*, 10:13-15. This is in contrast with the continuous change seen when video zoom operation displays images from only a single point of view throughout. *Id.*, 10:15-17. The ’291 patent defines a “smooth transition” as “a transition between cameras or POVs that minimizes the jump effect.” *Id.*, 10:17-19. The ’291 patent teaches methods for achieving a smooth transition in video zoom

mode, including position matching, to address the different spatial perspectives and viewing angles of each camera, as well as matching scale, brightness, and color. *Id.*, 10:19-27 *et seq.* The '291 patent further discloses how ramping methods may be employed to perform a “smooth transition” when the user zooms in and out in video mode. *See id.*, 10:34-11:40, Figs. 6-7, 12:3-13 (describing how to account for a “hysteresis” effect when zooming in as opposed to zooming out).

### **III. Claim Construction**

The Federal Circuit has held that “only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.” *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). This principle applies equally to IPR proceedings. *See, e.g., Apple Inc. v. Uniloc Luxembourg S.A.*, IPR2018-00420, Paper 7 at 8 (PTAB, Aug. 6, 2018).

The Petition asserts that the Board should construe “a fused output image” to “at least include ‘an output including information from two images.’” Pet., 7. While this term may ultimately be at issue at a trial if one is instituted, this Preliminary Response addresses the term “fused output image” as part of broader phrases, which serve to elucidate what “fused output image” means in the particular context of the '291 patent's claims.

The Petitioner has also since asserted in pending litigation between the parties that the term “smooth transition” in the '291 patent should be construed as it is

defined in the specification: “a transition between cameras or points of view that minimizes the jump effect.” Ex. 2001, 2 (Joint Claim Construction and Prehearing Statement filed in *Corephotonics, Ltd. v. Apple, Inc.*, Case No. 5:17-cv-06457, Dkt. 95, Oct. 26, 2018).

As discussed below, however, the Petition’s flaws are anyway apparent—and the Board may thereby reject the Petition—without adopting a particular construction of any terms, including “fused output image.” Should the Petition proceed to trial, however, Corephotonics may propose constructions to clarify any disputes which may become evident, for example in the Board’s decision to institute.

Further, to the extent that the Board does analyze the claims of the ’291 Patent, the Petition asserts that it “presents claim analysis in a manner consistent with **plain and ordinary meaning** in light of the specification,” i.e., the standard used in District Court, including in the above-referenced litigation between the Petitioner and Patent Owner. Pet., 6 (emphasis added.); *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). The Board should thus interpret the claims under the *Phillips* standard, rather than BRI, in accord with the Petition. *See SAS Institute, Inc. v. Iancu*, 138 S.Ct. 1348, 1357 (2018) (“[T]he petitioner's contentions, not the Director's discretion, define the scope of the litigation all the way from institution through to conclusion.”).



If the Board were to use the BRI standard, the Federal Circuit has cautioned that “[t]he protocol of giving claims their broadest reasonable interpretation does not include giving claims a legally incorrect interpretation divorced from the specification and the record evidence.” *In re Smith Int'l, Inc.*, 871 F.3d 1375, 1382 (Fed. Cir. 2017) (citations and internal quotations omitted). The specification must be considered, to determine whether it “proscribes or precludes some broad reading of the claim term” and to ensure that the interpretation of the claims is “not inconsistent with the specification.” *Id.* at 1383. Rather, claims must be afforded an interpretation that “corresponds with what and how the inventor describes his invention in the specification.” *Id.*

#### **IV. Applicable Legal Standards**

The petitioner has the burden to “demonstrate that there is a reasonable likelihood that at least one of the claims challenged in the petition is unpatentable.” 37 C.F.R. § 42.108. A petition challenging a claim on grounds of obviousness must sufficiently explain (1) “how specific references could be combined,” (2) “which combination(s) of elements in specific references would yield a predictable result,” and (3) “how any specific combination would operate or read on” the claims. *ActiveVideo Networks, Inc. v. Verizon Commc’ns, Inc.*, 694 F.3d 1312, 1327-28 (Fed. Cir. 2012).

Moreover, a petitioner may not rely on the Board to substitute its own reasoning to remedy the deficiencies in a Petition. *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1381 (Fed. Cir. 2016) (rejecting the Board’s reliance on obviousness arguments that “could have been included” in the petition but were not, and holding that the Board may not “raise, address, and decide unpatentability theories never presented by the petitioner and not supported by the record evidence”); *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1367 (Fed. Cir. 2015) (holding that “a challenge can fail even if different evidence and arguments might have led to success”). Nor may the Petitioner remedy the deficiencies in a reply brief. *Wasica Finance GMBH v. Continental Auto. Systems*, 853 F.3d 1272, 1286 (Fed. Cir. 2017) (“Rather than explaining how its original petition was correct, Continental’s subsequent arguments amount to an entirely new theory of prima facie obviousness absent from the petition. Shifting arguments in this fashion is foreclosed by statute, our precedent, and Board guidelines.”) (internal citations omitted).

**V. The Petition fails to establish the reasonable likelihood of a *prima facie* case of obviousness.**

**A. The Petition fails to explain why or how a POSITA would combine Christie with Parulski and Golan to teach providing “a fused output image of the object or scene [in still mode] . . . and to**

**provide without fusion continuous zoom video mode output images.”**

This limitation is not disclosed in *any* of the prior art references. The Petition contends that Christie must be combined with Parulski and Golan in order to teach providing an image that is the output of the fusion of images from both the Tele and Wide cameras in still mode, and an image that is created *without* fusion in continuous video zoom mode. Pet., 46. But none of the asserted references, including Christie, teaches combining images from two cameras to produce a fused output in still mode, but not using image fusion in video mode output. The Petition alleges no other basis for teaching such a configuration, which is necessary to find that Claim 1 (and the other independent Claim 12) are obvious. In turn, the Petition is fatally deficient, as it fails to demonstrate (1) that a POSITA would be motivated to combine Christie, which only discloses a single camera system, with Ex. 1006 which discloses a dual camera system, (2) that a POSITA would apply the disclosure of outputting images with HDR in Parulski and Christie to a combination with Golan directed to displaying zoomed images, (3) that a POSITA would modify what the combination teaches to actually disclose this limitation.

**1. None of the references disclose combining images from two different cameras for still images, but not for video.**

Christie is the only reference that the Petition asserts discloses a system which employs fusion for still images but not for video images, but Christie does not disclose fusion of images from two cameras, as required by the claims. Christie does not disclose any kind of multi-aperture or multiple camera system, and the Petition does not contend otherwise. Because Christie does not teach fusion of images from two cameras, it does not teach combining images from two different cameras (Wide and Tele) in still mode, but not video zoom mode.

Because none of the asserted references teach this element, the asserted combination does not teach this element. Rather, the Petition asserts that one of ordinary skill would be able to take the teaching of Christie and use it to modify Parulski and Golan in a way not taught by any of the asserted references. This argument is impermissible hindsight.

**2. The Petition fails to explain how Christie's disclosure of HDR can be applied to Parulski and Golan's purported teaching of using a dual camera system for optical zoom.**

Christie is inapposite to the invention of '291 patent. Whereas the claimed invention is directed to the use of two cameras with different fixed focal lengths to achieve optical zoom, Christie is directed to improving touch-sensitive user

interfaces for single camera systems. *See, e.g.*, Ex. 1007, ¶ 2-5. Christie is a single camera system. It has no teaching at all related to optical (or digital) zoom or dual camera systems.

The Petition relies on Christie's disclosures regarding outputting images from a single camera with high "dynamic range" (HDR). However, the Petition fails to explain how Christie's disclosure of a single camera system would relate to improving the performance of a dual camera system, or why a POSITA would have been motivated to look to conventional single camera systems as the source of solutions for the problems posed by more complex dual camera systems. The Petition simply asserts that a POSITA would "naturally have considered the teachings" of Christie because it was one of the Petitioner's patent applications. Pet., 17. The Petition also does not explain how the "teachings" of a single lens system would be applicable to a multiple lens system of Parulski.

Christie's teaching of combining images from a single camera for HDR relates to dynamic range. It has nothing to do with the claimed element of combining images from two cameras with different points of view and different focal lengths to create a single composite image from a particular point of view to achieve optical zoom in still mode, but not in video zoom mode. The dynamic range of an image is the difference between the lightest and darkest tones in an image, for example, such that a high dynamic range (HDR) image would not allow light or shadow sources to

“overpower the picture and result in a murky discolored photo.” Ex. 1009. Images with high dynamic ranges may be obtained by combining images at different levels of exposure. *Id.* By contrast, as described above in Section II.B of this Response, fusion in the context of claims 1 and 12 of the ’291 patent requires the combination of images with distinct fields of view (Wide and Tele) and distinct points of view, to create a single composite image from a particular point of view to achieve optical zoom.

Notably, much of Parulski’s disclosure concerns the use of its dual camera system to provide images with high dynamic range. *See, e.g.*, Ex. 1006 7:62-66 (disclosing that the secondary output image may be used “modify the dynamic range of the primary image (e.g., where the secondary output image is captured by the second imaging stage at a different exposure level than used by the first imaging stage to capture the primary output image)”).; *see also* 28:58-29:35. If HDR and dynamic range were relevant to the claimed image fusion for zoom, one would expect the Petition to cite to Parulski’s HDR fusion disclosure for various elements of claim 1. Tellingly, however, the Petition does not discuss or cite anything related to dynamic range in connection with any of the other elements of claim 1 that the Petition contents are taught in Parulski. *See, e.g.*, Pet., 23-24 (citing the ’291 patent) *et seq.* And, in arguing that Golan could be combined with Parulski and Christie, the Petition switches back to discussing zoom exclusively. *See* Pet. 20-22. The Petition

fails to describe any connection between Christie’s disclosure of HDR or issues relating to dynamic range and Parulski/Golan’s disclosures regarding zooming at all. It does not even include a conclusory statement or a citation to the expert declaration on this issue.

Instead of explaining how Christie could be combined with Parulski and Golan, the Petition merely asserts that “Dr. Cossairt confirms that a POSITA would readily appreciate it.” *Id.*, 46. This is not enough, because to prevail the Petition must establish that one of ordinary skill in the art *would* have (rather than *could* have) been motivated to combine the references *and* “would have had a reasonable expectation of success in doing so.” *Personal Web Tech. v. Apple*, 848 F.3d 987, 993 (Fed. Cir. 2017). The cited paragraph in the Cossairt declaration merely parrots that conclusory statement. Ex. 1004, ¶ 122. It fails to explain how a POSITA would have applied a disclosure that relates to fusing multiple images from a single camera to the problem of fusing single images that come from two separate cameras. The Cossairt declaration also fails to articulate a why a POSITA would have had a reasonable expectation of success in applying a single camera solution in a dual camera environment. This deficiency alone is thus fatal, as the Petition’s only ground for obviousness of claim 1 and 12.

The Petition thus flagrantly violates the bedrock principle that a challenge on obviousness grounds may only prevail if it avoids “the distortion caused by hindsight

bias and arguments reliant upon ex post reasoning.” *Zoltek Corp. v. United States*, 815 F.3d 1302, 1313 (Fed. Cir. 2016). Absent any articulated reasoning, or even a conclusory statement otherwise, the Petition’s argument amounts to a tailored combination of references that then tries to supply the still-missing elements by following the roadmap of provided by claims 1 and 12. This is an impermissible use of hindsight. The Petition simply treats Christie as no more than a piece in the “jigsaw puzzle” that can complete the argument it needs to make on this limitation, since neither Parulski nor Golan, alone or in combination, teach it. *See also InTouch Technologies, Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327, 1351 (Fed.Cir.2014) (warning against a “jigsaw puzzle” approach to obviousness).

**3. Even if *arguendo* Christie could be combined with Parulski and Golan, the Petition still fails to demonstrate that this limitation would have been obvious.**

Because none of the references, alone or in combination, teaches a fused output image *from two cameras* in still mode and continuous video zoom output images without fusion, a POSITA would need to modify Parulski’s two camera system beyond what Christie teaches to meet the limitation. The Petition, however, fails to articulate why a POSITA would be motivated to modify Parulski by looking to Christie’s disclosure regarding HDR to achieve the recited limitation, and that a



POSITA would have a reasonable expectation of success in making such a modification.

Christie does not even teach the principle that the Petition relies on it for. Christie neither teaches that HDR *should* not be used for video images, nor provides any rationale for how to decide when HDR should be used or not. The Petition alleges that Christie teaches a camera in which HDR functions are available in still mode but not available in video mode. Pet., 43. In fact, all that Christie teaches is a user interface that displays HDR functions only in still mode when they are only available in still mode and not for “a video camera or a panorama camera, etc.” Christie, ¶ 202 (cited at Pet. 43). Christie thus does *not* teach that HDR cannot, let alone should not, be available in video mode. Christie does not teach anything about image processing or camera design. Christie’s disclosure relates only to the configuration of a user interface running on a device that reflects whether HDR has been made available in video mode on that device.

Attempting to mask this deficiency, the Petition substitutes speculation for evidence. The Petition asserts without evidence that a POSITA would have recognized that not providing HDR in video mode would “obtain the benefits of conserved power, increased time between battery charges, high quality still output images, and high frame rate video output images.” Pet., 17. This list of alleged benefits draws directly from what the ’291 patent recognizes were the problems with

the prior art approach to fusing images taken with two different fields of view, which in turn prevented optical zoom with a dual fixed-focal length camera system from being a practical solution. *See* Ex. 1001, 2:25-28, 12:38-43 (“[D]ual aperture optical zoom digital cameras and associate methods disclosed herein reduce the amount of processing resources, lower frame rate requirements, reduce power consumption . . . when changing from Wide to Tele in video mode.”) The Petition’s application of the ’291 patent’s own recognition of these problems signals hindsight bias. *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1377 (Fed. Cir. 2012) (“Often the inventive contribution lies in defining the problem in a new revelatory way.”).

Besides its hindsight problem, the Petition is also factually deficient because it presents no evidence to support the argument that Christie does not use HDR in video because of power consumption. Despite the Petition’s characterization of the Christie and Parulski references as being concerned about optimizing battery life and power consumption, it points to nothing in either reference that describes methods to reduce power consumption in the process of combining images. As to Parulski, all the Petition can point to is the mere disclosure that “power management components” exist. *See* Ex. 1006 27:47-49 (“Electronic components 624, such as resistors, capacitors and power management components are also mounted on the Substrate 620.”) (cited at Pet., 18). The Petition also fails to provide any evidence that the algorithms involved in HDR would—if applied in video mode—impact

power consumption. The Petition alludes to the Petitioner's former CEO, Steve Jobs, describing "pretty sophisticated algorithms" used in HDR. Pet., 18 (citing Ex. 1009). The Petition though cites no evidence that those algorithms would require substantial power consumption. By contrast, the '291 patent explains that the problem of increased power consumption in a *dual* camera system arises when both cameras are required to be operational at the same time.

The Petition's other argument based on the need to produce high frame rate video output image also fails. The petition fails to explain how this particular problem arises in video zooming-in and -out operations, as the claim requires, rather than being associated with HDR in video (in a single camera system). HDR requires integrating information from images taken in succession over a period of time to generate a single output image. *See, e.g.*, Ex. 1009 (describing how the HDR camera works by "taking three photos in rapid succession: one with normal exposure, one underexposed, and another overexposed"). As a result, doing HDR with a video camera to produce video with standard frame rates would require a camera that can capture images at a much greater than standard frame rate. In addition, the need to capture frames at a higher rate would limit the ability to capture long exposure frames, limiting the benefits of HDR. These limitations of frame rate and exposure length do not apply to a dual camera image fusion system that is directed to optical zoom, such as the one disclosed by '291 patent. As such, a PHOSITA would not find

any teaching or motivation to modify Parulski to not combine images during video zoom mode in view of Christie.

The '291 patent identifies providing fused output images in still mode and video mode output images without fusion as a significant limitation. *See* Ex. 1001, 2:25-28, 12:38-43. It further provides an extensive and detailed disclosure for how the dual camera system would be configured to display output images while zooming in and out in video mode, for example in its disclosure of “Video Mode Operation/Function.” *See id.*, 10:11-12:12. The '291 patent provides a comprehensive teaching of what would be necessary for a system that satisfies this limitation of claims 1 and 12.

By contrast, neither the Petition nor the Cossairt declaration elucidate how Parulski would need to be modified to satisfy the limitation or address whether such a modification in the context of Parulski would have a reasonable expectation of success. The Petition and Cossairt declaration merely assert that a POSITA would “apply” Christie and Golan to Parulski to satisfy this limitation, without any further explanation of what that means. *See* Pet., 45-46, 49-50; Decl., ¶¶ 68, 74, 121-22, 128. This is legally insufficient. The Petition cannot rely on a conclusory assertion to satisfy a missing limitation, particularly where the missing limitation is not a “peripheral issue” but rather “goes to the heart of an invention.” *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1362–63 (Fed. Cir. 2016), *cert. denied sub nom. Google*

*Inc. v. Arendi S. A. R. L.*, 137 S. Ct. 1329 (2017); *see also K/S Himpp v. Hear-Wear Techs., LLC*, 751 F.3d 1362, 1365–66 (Fed. Cir. 2014) (holding that the Board correctly declined “to accept a conclusory assertion from a third party about general knowledge in the art without evidence on the record, particularly where it is an important structural limitation that is not evidently and indisputably within the common knowledge of those skilled in the art.”).

There is thus no support in the Petition nor even any evidence on which a Petitioner could rely upon at trial to support its argument on this claim limitation. And, even if the Petitioner were to assert at trial that such a modification would be common sense or require only “ordinary creativity” of a POSITA, that would be insufficient for the Petition to prevail. *DSS Tech. Mgmt., Inc. v. Apple Inc.*, 885 F.3d 1367, 1377 (Fed. Cir. 2018) (Board may not not rely on “ordinary creativity as a wholesale substitute for reasoned analysis and evidentiary support” when dealing with a limitation missing from the prior art).

In sum, the Petition’s asserted reasons to modify Parulski in view of Christie were impermissibly lifted from the ’291 patent’s own disclosure, are unsupported by evidence, and do not apply to fusion to achieve optical zoom as claims 1 and 12 require. The Petition should be denied on the basis of each of these defects.

**B. The Petition fails to demonstrate that the alleged prior art teaches**  
**“to provide a fused output image *from a particular point of view.*”**

Parulski fails to teach a camera controller configured “to combine . . . Wide and Tele image data to provide a fused output image from a particular point of view.” The Petition’s cursory description of how Parulski allegedly teaches this limitation mischaracterizes what the “point of view” means in the context of the ’291 patent. The ’291 patent defines point of view (POV) as a matter of the distinct perspective and shape of objects and scenes in the images captured by telephoto and wide-angle cameras:

In a dual-aperture camera image plane, as seen by each sub-camera (and respective image sensor), a given object will be shifted and have different perspective (shape). This is referred to as point-of-view (POV). **The system output image can have the shape and position of either sub-camera image or the shape or position of a combination thereof.** If the output image retains the Wide image shape then it has the Wide perspective POV. If it retains the Wide camera position then it has the Wide position POV. The same applies for Tele images position and perspective.

Ex. 1001, 4:60-5:2 (emphasis added). The specification goes on to teach methods for generating fused output images with a (single) particular, consistent POV from the information in the Wide and Tele images. *See id.*, 5:5-10, 9:15-36, Fig. 5. This contrasts with methods in the prior art in which an output image included portions

from one POV and portions from another POV. See, e.g., Ex. 1001, 2:14-21 (describing the disclosure of “fused” images created from images that are “stitched” together to form a “composite” image), 4:63-65 (“The system output image can have [the POV] of either sub-camera image or [the POV] of a combination thereof.”).

The Petition fails to demonstrate that Parulski teaches providing an output image from a “*particular*” point of view. The Petition concedes that Parulski discloses “replacing *portions* of the primary image with *portions* of the secondary image.” Pet., 42 (emphasis added). This refers to the prior art stitching method that results in a fused output image that has a combination of both POVs, as discussed in the background of the ’291 patent. See Ex. 1001, 2:14-21, 4:63-65.

The Petition’s argument on this limitation is fundamentally flawed from the start, as it relies on a citation to Parulski that does not relate to zoom images or the points of view of telephoto and wide-angle cameras. Pet. 42 (citing Ex. 1006, 29:4-7). The context for that citation in Parulski is that a “primary image could be captured at a normal exposure, while the secondary image could be captured at more of an extreme exposure, i.e., either under- or over-exposed,” and then depending on the degree of shadows or highlighting in the primary image, the secondary image could be under or over-exposed. Ex. 1006, 28:63-29:4. This disclosure has nothing to do with “point of view” as it is described in the context of the ’291 patent, which relates to how images from different cameras will show objects that are shifted and have

different shapes. The Petition provides no explanation for how a POSITA would apply Parulski's disclosure of adjusting the intensity of an output image to combine image data from two cameras that show objects with different shapes or positions, as needed to achieve a fused output image from a single, cohesive, "particular point of view" as required by claims 1 and 12 of the '291 patent.

The Petition does not explain how this mixture of portions of the primary and secondary image represents an image from a *particular* point of view, let alone being from the "same" point of view as the primary image as required by the '291 claims. The Petition instead provides a single conclusory sentence, asserting that a "POSITA would have understood that the resulting output image would be from the **same** point of view as the primary image . . . from the primary capture unit . . . ." *Id.* (emphasis added). Notably, the Petition elides the term "*particular*," asserting without explanation that this conclusory statement explains how Parulski discloses this limitation in full. *Id.*

The Petition does not point to any disclosure in Parulski of how using two separate cameras results in images with objects that have different shapes and positions from two different points of view, and then how images from the wide-angle and telephoto camera points of view would be fused to obtain an image that shows the objects from a particular point of view. The Petition does not explain how any other reference, or a POSITA, would have understood this problem. The Petition



thereby fails its most central task, to present a “full statement of the reasons for the relief requested, including a detailed explanation of the significance of the evidence. . . .” 37 C.F.R. § 42.22(a)(2).

The Petition compounds its error by relying on a citation to its expert’s declaration and other extrinsic references to support its assertion without further explanation. *See* Pet. 42 (citing Ex. 1004, ¶ 115; Ex. 1013, Ex. 1016). The Petition’s lack of any explanation for the limitation other than this bare citation represents a fatal defect in the Petition, as a petition may not rely on arguments in an expert declaration incorporated by reference or otherwise not supported in the petition itself. 37 C.F.R. § 42.6(a)(3) (“Arguments must not be incorporated by reference from one document into another document”); *see also Cisco Systems, Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12 at 9 (PTAB, Aug. 29, 2014) (“This practice of citing the Declaration to support conclusory statements that are not otherwise supported in the Petition also amounts to incorporation by reference.”).

Though it is not discussed in the Petition, which renders it outside the scope of this proceeding, the accompanying expert declaration does briefly describe a complex scheme that purports to achieve a fused output image from a point of view where point of view is understood as reflecting how the objects would be shifted as seen from two cameras. *See* Ex. 1004, ¶ 115. As an initial matter, this shows that the Petitioner and Petitioner’s expert, Dr. Cossairt, concede that this is the understanding

of point of view according to the '291 patent. But the Cossairt declaration fails to elucidate how the theoretical registration and mapping operations that he speculates could possibly be employed would, in fact, yield an output image that is from a *particular* point of view. For example, the Cossairt declaration does not describe how to address objects or scenes that are occluded, i.e., objects visible from one camera but blocked in the other because of their different points of view. By way of another example, the declaration does not address the fact that Wide and Tele images only partially overlap because the cameras have different fields of view. *See* Ex. 1001, Fig. 2.

The Board does not have to reach the Cossairt declaration's (still) limited and deficient discussion of this limitation in the declaration, however. Not only does his expert declaration's cursory discussion confirm that the Petition does not have a reasonable likelihood of success, but the Petition should be rejected as it has failed to comply with the requirements of specificity and completeness, as it improperly incorporates the material in the declaration by reference.

**C. The Petition fails to demonstrate how Golan teaches providing video zoom output images “with a *smooth transition*” when switching between zoom factors.**

As the Petition concedes, the sole reference it asserts as purportedly teaching this limitation, Golan, was already considered in the prosecution. The Board,

therefore, could deny the Petition on this basis alone under § 325(d) on this basis alone. The Petition, moreover, does not describe *how* Golan uses a one-time factory calibration to effectuate a “smooth transition” as required by the ‘291 patent.

The Petition omits this description because it would undercut the foundation of its argument. Contrary to what the Petition implies, Golan does not disclose implementing a transition that minimizes a jump effect while switching between zoom factors while continuous zoom video is being output. Golan only discloses the use of electronic calibration to “facilitate” video output in a two-camera system. During Golan’s prosecution, the Patent Office recognized the limit of what Golan discloses, and the applicant did not dispute this understanding. In particular, Golan’s one-time calibration disclosure implies that the camera sensors would already have been adjusted to address the offset between their alignment. *See* Ex. 2002, 6 at 5 (“[B]y performing the electronic calibration of the alignment between multiple image sensor arrays, the first image sensor array and said second image sensor array, when the imaging is switched between the different image sensors, the output images are considered to be aligned, thereby facilitating continuous electronic zoom with uninterrupted imaging.”).<sup>2</sup> Golan’s corresponding silence on how the system it proposes would use the calibration while delivering images sharply contrasts with

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<sup>2</sup> The applicant did not respond to this office action and prosecution of the Golan application was subsequently abandoned. Ex. 2003.

the '291 patent's extensive disclosure of how to implement gradual transitions between images with different levels of resolution, color balance, etc. *See* Ex. 1001, 10:28-12:12.

The Petitioner concedes that Golan requires more to satisfy the “with a smooth transition” claim limitation in the context of the '291 patent. But rather than describe how Golan would need to be modified to provide video output images with a smooth transition, the Petition again improperly relies on conclusory statements followed by citations to material provided in extrinsic references and Dr. Cossairt's expert declaration. *See* Pet., 53 (citing Ex. 1004 ¶¶ 135-37; Ex. 1012-13; Ex. 1015). Such wholesale incorporation of material outside the Petition is prohibited under § 42.22(a)(2) and § 42.6(a)(3). And, even were it not, the Cossairt declaration's arguments do not add up to enough for the Petitioner to prevail, as discussed in turn below.

*First*, the Petition asserts that Dr. Cossairt “confirms” that “numerous” design and processing methods were known for allowing a smooth transition. But the cited paragraph in the Cossairt declaration fails to describe how the references it cites would be applied to video output or providing a smooth transition, only that these references disclose either preset electronic calibration or mechanical alignment between two separate cameras. Ex. 1004, ¶ 137. The Cossairt declaration provides no explanation of how the prior art which determined a pre-existing static alignment

between cameras would extend to what the '291 patent teaches, which is providing video zoom put with a smooth transition during the switching between cameras or points of view. Such a leap is a hallmark of hindsight bias. *See W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983) (warning against “the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher”).

*Second*, the Petitioner relies entirely on its expert to explain how Golan could actually be modified to use electronic calibration data to effectuate a smooth transition. *Id.*, ¶ 136. The Cossairt declaration though fails to demonstrate that a POSITA *would* use the calibration data that Golan discloses in the manner that the declaration describes, as it must to establish obviousness. *Personal Web*, 848 F.3d at 993. Moreover, what Petitioner’s expert describes as the adaption of Golan to achieve “smooth transition”—a registration and mapping scheme to obtain images from the same point of view—is effectively the same the same scheme proposed to modify Parulski to satisfy the “fused output image” limitation. *Compare* Ex. 1004, ¶ 115 *with* ¶ 136. But claims 1 and 12 require that the video zoom output be produced *without* fusion. The Cossairt declaration fails to reconcile or even address this contradiction, and how its expert’s proposed modification to Golan would be a way of providing smooth transition without fusion. The declaration also fails to address how the modification to Golan would not incur the purported costs of processing

time and power consumption, which it argues preclude the use of such algorithms in video mode. The Cossairt declaration simply fails to address the reasonable expectation of success in modifying Golan as it suggests. In sum, the Petition, on its own or incorporating the arguments in the Cossairt declaration, fails to provide legally sufficient support for modifying Golan to provide continuous video zoom output images “with a smooth transition” and without fusion as the claims require. *DSS Tech.*, 885 F.3d at 1377; *Arendi*, 832 F.3d at 1362-63; *Hear-Wear*, 751 F.3d at 1365-66.

## **VI. Conclusion**

For the reasons set forth above, Patent Owner respectfully requests that the Board deny institution of the Petition.

Dated: November 7, 2018

Respectfully submitted,

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**CERTIFICATION REGARDING WORD COUNT**

Pursuant to 37 C.F.R. §42.24(d), Patent Owner certifies that there are 7,509 words in the paper pursuant to 37 C.F.R. §42.24(a)(1).

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**CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(e)(1))**

The undersigned hereby certifies that the above document was served on November 7, 2018, by filing this document through the Patent Review Processing System as well as delivering a copy via electronic mail upon the following attorneys of record for the Petitioner:

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